

# **Wetland Inventory and Mapping Project**

*Final Report*

**Appomattox Court House National Historical Park**

**Appomattox County, Virginia**

*July 1<sup>st</sup>, 2002*

**Prepared for:**

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## INTRODUCTION

The purpose of the study is to delineate and map all wetlands and all other “waters of the United States” subject to jurisdiction under Section 404 of the Clean Water Act and all wetlands subject to National Park Service (NPS) procedures for implementing *Director’s Order #77-1: Wetland Protection*. This effort is needed as part of compliance for planning related to Appomattox Court House National Historical Park (APCO) General Master Plan (GMP). The GMP is a long-range planning document that directs the overall preservation and development of the park by identifying the resource conditions and visitor experiences the park should strive to achieve. As part of this planning process, the park must obtain a wetland inventory based on the U.S. Fish and Wildlife Service wetland classification system. An assessment of both wetland and stream functions is also required in order to guide the development of the GMP.

Reference materials utilized in this report include:

1. “Corps of Engineers Wetlands Delineation Manual, 1987”. Technical Report Y-87-1. Environmental Laboratory. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
2. “Classification of Wetlands and Deep Water Habitats of the United States”. FWS/OBS-79/31. December, 1979. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.
3. “National List of Plant Species that Occur in Wetlands, Region 1 - Northeast”. 1988. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.
4. Bartoldus, C.C., E.W. Garbisch, and M.L. Kraus. 1994. *Evaluation for Planned Wetlands (EPW)*. Environmental Concern Inc., St. Michaels, Maryland. 327 pp. and appendices.
5. National Wetlands Inventory. Appomattox and Vera Quadrangles. Office of Biological Services, U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C. April 1981.
6. Soil Survey of Appomattox County, Virginia ArcView Theme. U.S. Department of Agriculture, Soil Conservation Service. Washington, D.C. Theme provided by NPS
7. State of Virginia Hydric Soils List. Revised December 15, 1995. U.S. Department of Agriculture; Natural Resources Conservation Service. Richmond, Virginia.
8. Color infrared photographic mosaic. Flown on December 18<sup>th</sup>, 2000. Provided by National Park Service.
9. Stereoscopic aerial photographic photography. Sixty-four (64) color infrared stereo aerial photographs. Seven (7) total flight lines that comprise Appomattox Court House NHP with the exception of the most recently acquired northwest parcel.

This report is submitted in three sections plus appendix. The first section identifies the site location, gives an overview of the site, and generally describes the existing vegetation and physical relief. The second section outlines the Corps of Engineers criteria for determining wetland status, our protocols employed, detailed descriptions of the wetland boundaries including the vegetation, hydrology and soils of each wetland area. This section also includes background and definitions of the U.S. Fish and Wildlife Service’s “Classification of Wetlands and Deepwater Aquatic Habitats of the United States” by Cowardin et al. These two methods were utilized to identify and delineate wetland boundaries and other “waters of the United States” in accordance with NPS Director’s Order #77-1. A narrative discussion describing our findings on each identified wetland is also presented. The next section, Section 3, provides the background and scoring protocol for the wetland functional assessment portion using the EPW methodology. The results of the wetland functional assessment are also discussed. The final section includes maps showing the site location (**Plate 1; Site Location Map**) and the study area boundary overlaid on National Wetlands Inventory (**Plate**

**2; National Wetlands Inventory Map).** **Plate 3; Soil Series Map** provides the soil mapping units relation to the National Park Service boundaries and roads. **Plate 4; Wetland & Waters of the United States Boundaries** depicts the map panel locations overlain upon the color aerial mosaic. The remaining plates numbered 5 through 9, displays the mapped wetland and stream systems with the data collection points also provided. **Appendix A** contains the data form sheets for routine wetland determinations (1987 COE Wetlands Delineation Manual approved February 1992) describing the vegetation, hydrology and soils. **Appendix B** reflect the wildlife flow model diagrams from the EPW wetland functional assessment results with a blank field data sheet set included in **Appendix C**. The last set of data sheets in **Appendix D** provide stream assessment forms for the locations shown on the map panels. These sheets give the functional value for both the area between the channel banks and, if present, the adjacent floodplain connectiveness to the stream system.

## **SECTION 1**

### **SITE DESCRIPTION**

#### **Site Location:**

Referring to **Plate 1; Site Location Map**, the study area is located roughly 80 miles west of Richmond, Virginia approximately 3 miles north of the town of Appomattox. Route 24 bisects the site in two sections with the western half nearly twice the size of the eastern half.

#### **Overview:**

Appomattox Court House National Historical Park was established in 1935 for the purpose of commemorating the end of the Civil War. The park today covers 1743 acres and protects the cultural and natural resources and historic structures that help visitors understand the events of 1865. Approximately half of the park is forested while the other half is maintained as fields. Approximately 400 acres of fields are leased for agricultural uses. Generally, the fields are located on the top of the hills with the forested areas comprising the slopes.

Located in the Piedmont region of central Virginia, the park lies in an area of gently rolling hills with the Appomattox River flowing along the western boundary before turning to the east under Route 24 then exiting the site. This main stream connects with many other side tributaries with Plain Run Branch joining the Appomattox River just east of Route 24. Grades vary from mildly undulating, 0 to 2 percent range, along the hill tops gradually increasing in inclination up to 15 percent down to the toe of slopes. Steeper grades nearing 25 percent on the south side of the Appomattox River floodplain. The floodplain area for the Appomattox River and for the lower 1,000 foot section of Plain Run Branch is nearly level.

#### **National Wetlands Inventory (NWI) Map:**

Referring to **Plate 2; National Wetlands Inventory Map**, the APCO project area boundaries are overlain upon the National Wetlands Inventory (NWI) Appomattox and Vera quadrangles. These maps indicate that eight (8) different Palustrine wetland classes are situated on APCO property. Three different types (PEM1Cb, PEM1Fb and PFO1Cb) are noted to have been influenced by beaver. No Riverine systems are mapped on these documents.

### **Soil Conservation Service (SCS) Map:**

As seen on *Plate 3; Soil Series Map*, the Soil Conservation Service soils map, obtained from NPS supplied Arcview theme, notes that thirteen (13) different soil series occur on the project. Of these mapping units, two (Iredell loam & Mecklenburg-Poindexter complex) are noted as having a respective two and three different slope phases.

The State of Virginia hydric soil list indicates that only two (2) series, the Chewacla loam and Wehadkee loam, are listed as hydric soil mapping units. The Chewacla loam forms the floodplains of both the Appomattox River and Plain Run Branch. The Wehadkee loam soil series is mapped in the southwestern portion of APCO property. These areas were investigated to determine the presence of hydric soil traits during the field review.

## **SECTION 2**

### **WETLAND DELINEATION**

#### **Wetland Determination Criteria:**

As previously discussed, NPS through Director's Order #77-1 requires mapping of wetlands and all other "waters of the United States". This requirement dictates the need for two types of wetland methods; namely by the 1987 COE wetland delineation methodology and the 1979 USFWS *Classification of Wetlands and Deepwater Habitats of the United States* definitions.

The COE method for defining the wetland / upland boundary is determined using the definition as outlined in the U.S. Army Corps of Engineers *Wetlands Delineation Manual*, 1987. The wetland indicator status of observed dominant plant species is determined using the 1988 USFWS *National List of Plant Species that occur in Wetlands, Region 1 - Northeast*.

The delineation procedure involves establishing a transect in a known wetland area and following that transect towards an upland area until wetland conditions no longer exist. At even intervals, the required criteria for hydric soils, vegetation, and hydrology are reviewed. Once a sample point is found to lack one of the three mandatory criteria for wetland status (hydrophytic vegetation, wetland hydrology, hydric soils), that area is examined more closely until the wetland limits are established. The wetland / upland line is then extended using the obtained transect data.

For determining the presence of hydrophytic vegetation, plant species within each community are visually identified by layer (e.g. trees, saplings/shrubs, herbs and woody vines) and listed in descending order of dominance. For each plant species, indicator status and categories are defined by the 1988 USFWS Region 1 plant list. The following list defines wetland plant indicator categories:

- **OBL** (Obligate Wetland Plants) occur greater than 99 percent of the time in wetlands under natural conditions.
- **FACW** (Facultative Wetland Plants) occur between 67 and 99 percent of the time in wetlands under natural conditions.



- **FAC** (Facultative Plants) occur between 33 and 67 percent of the time in wetlands under natural conditions.
- **FACU** (Facultative Upland Plants) occur between 1 and 33 percent of the time in wetlands under natural conditions.
- **UPL** (Obligate Upland Plants) occur less than 1 percent of the time in wetlands under natural conditions.

A “+” sign following an indicator status denotes that the species generally has a greater estimated probability of occurring in wetlands, while a “-” sign denotes a lesser estimated probability of being present in wetlands. The wetland plant indicators are given for each dominant plant species identified on the attached Routine Wetland Determination forms in *Appendix A*.

By Corps of Engineers criteria, if more than 50 percent of the dominant plant species are OBL, FACW, or FAC, then the hydrophytic vegetation parameter is met.

For determining the presence of wetland hydrology, recorded data is the most reliable evidence in confirming that the required saturation duration of a minimum of 12.5% of the growing season is satisfied. Unfortunately most sites do not have recorded data hence reliance on primary and secondary field indicators such as inundation, soil saturation, and watermarks on woody vegetation are sought. Using indicators such as these, an evaluation of the site is made to determine if the Corps of Engineers criteria for wetland hydrology is satisfied.

For determining if hydric soils are present, soil series mapped within the property boundaries are referenced to the National Technical Committee for Hydric Soils list. Once a soil series is known to be hydric or to contain hydric soil inclusions, representative soil probes are taken in the field and are used to confirm the presence or absence of hydric soils. For nonsandy soils, indicators such as gleying, low matrix chroma (<2) and presence or absence of mottles are used to confirm soil type. Sandy soil indicators rely on the presence and distribution of organic matter within the upper sixteen (16) inches of the soil profile.

### **Wetland Boundaries and Characteristics:**

After locating the wetland zones by the COE method, grouping according to type of wetland was performed with the remaining upland areas reviewed by applying the wetland descriptions outlined in the USFWS publication entitled *Classification of Wetlands and Deep Water Habitats of the United States*.

The U.S. Fish and Wildlife Service Publication FWS/OBS-79/31 use the taxonomic classification of *systems* to categorize wetlands by their geographic setting. The wetland USFWS wetland classifications are as follows: Marine, Estuarine, Riverine, Lacustrine and Palustrine. Of these systems, only the Riverine and Palustrine are found in the study area. Four of the five above-mentioned wetland *systems* possess subordinate *subsystems* that address their geologic setting and all five *systems* can be refined to taxonomic descriptive units of *class*, *subclass* and *dominance type*.

The *class* taxonomic component is subordinate to *subsystem* and provides a general description of the dominant existing vegetative life forms of the ecological community, the geomorphic setting, flooding regime and the substrate composition.

The taxonomic level of *subclass* provides a refined description of the plant community. For example, the publication FWS/OBS-79/31 identifies the following subclasses: Palustrine Broad-Leaved Deciduous forest (PF01) and a Palustrine Forest Needle Evergreen plant community (PF02). Water regime modifiers were also added to the USFWS subclass definitions.

### ***Palustrine Wetland Systems***

Palustrine systems are typically represented by all nontidal wetlands dominated by trees, shrubs, and persistent or non-persistent emergent vegetation in areas where ocean derived salinities are less than five parts per thousand. Wetlands that have traditionally been called marshes, bogs, and swamps are collectively categorized under the Palustrine system. The Palustrine system also includes shallow, intermittent, or permanent bodies of water commonly referred to as ponds. Palustrine wetlands are generally located landward of rivers, streams, lakes and estuaries. The maximum depth of water associated with the Palustrine systems is 6.6 feet, which is defined by the USFWS as the maximum water depth associated with the presence of non-persistent emergent vegetation.

The prevalent substrate texture underlying Palustrine systems are used to distinguish different wetland classes if the existing above ground vegetation covers less than 30% of the ground surface. The substrate provides information on abiotic influences, such as wind, currents and deposition of eroded substrate material within the wetland system.

### ***Riverine Systems***

Riverine systems includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergents, emergent mosses, or lichens, and (2) habitats with water containing some ocean derived salts in excess of 0.5 parts per thousand. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.

The Riverine System is bounded on the landward side by upland, by the channel bank (including natural and man-made levees), or by wetland dominated by trees, shrubs, persistent emergents, emergents mosses, or lichens. In braided streams, the system is bounded by the banks forming the outer limits of the depression within the braiding occurs. This system terminates at the upstream end where the tributary streams originate. Springs discharging into a channel are considered part of the Riverine System.

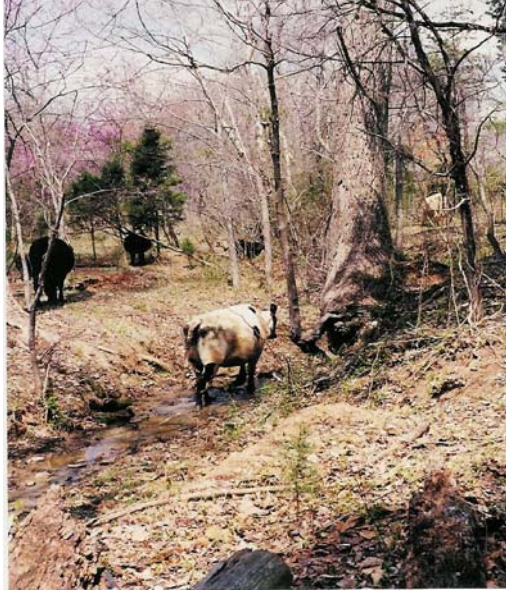
Water is usually, but not always, flowing in this system. Upland islands or Palustrine wetlands may occur in the channel, but they are not included in the Riverine System. The Palustrine wetlands may occur adjacent to the Riverine System, often on floodplains.

### **Wetland Identification Discussion:**

Using the above published data sources and both USFWS and COE wetland identification methods, twenty-eight (28) different Palustrine wetland and Riverine systems were identified within the National Park Service property boundaries. The results of the mapping effort are given on Plates 4 through 9. When comparing these field mapped wetlands with those shown on the NWI map (*Plate 2*) several differences are noted:



- Riverine systems comprise a significant portion of APCO aquatic resources with the systems in the active grazing areas being degraded both physically and qualitatively by cattle. These affected Riverine systems are denoted by the special modifier of (f) for farmed wetlands.



**Cattle using stream systems**



**Cattle induced erosion along stream banks**

- In the more recently acquired northwest parcel and the central section of the tributary north of Appomattox Court House, downcutting has incised the channel with nick points evident in the upper reaches



**Stream nick point in NW parcel**



**Exposed bank face from incised stream**



- Twice as many different types of Palustrine wetlands were mapped with this study (16) than mapped in the 1981 NWI wetland maps (8).



**Beaver influenced Palustrine wetland complex**



**Grazed headwater emergent wetland system**

- The NWI wetland system of PFO1Cb was determined during this field effort to not be influenced at all from beavers. It appears from the current work that this depressional system appears to have been historically influenced by man; possibly for use as an ice pond.



**PFO1Cb NWI mapped wetland system**

- The current field effort has noted several areas (PEM1Bx & R3UB3x on Plate 5 and R3UB3x on Plate 7) near the stagecoach road floodplain as excavated features. Due to the proximity to the Appomattox River and the historical significance of the park, these historically created systems may be the result of shallow Civil War entrenchments.





**Shallow excavated wetland system north of Appomattox River**

- The PUBHx wetland mapped by NWI in 1981 appears to have been subsequently been filled. This feature appears related to the septic disposal for APCO and possibly was transformed from an open excavated pond to a drainfield.
- The floodplain wetlands noted in this study as PFO1J encompass the largest wetland area (75.51 acres) and are contiguous along the majority of the Appomattox River and the lower 1,000 feet of Plain Run Branch while the 1981 NWI map notes these as discrete wetland entities.



**Floodplain wetland system along Appomattox River**



**Active beaver cuttings**

Referring to *Plates 4 through 9*, the wetland and stream systems are shown. The following **Table 1; Palustrine Wetland Systems** provides the Cowardin wetland types, acreages of each delineated site and whether the wetlands are jurisdictional wetlands, other Cowardin wetlands (e.g., unvegetated or nonsoil wetlands) or “other waters of the United States”.

**Table 1; Palustrine Wetland Systems**

<b>USFWS Symbol</b>	<b>Area (acres)</b>	<b>USFWS Wetland Classification</b>	<b>Jurisdictional Wetland</b>	<b>Other USFWS unvegetated or nonsoil wetland</b>	<b>Other Waters of the United States</b>
<b>PEM1B</b>	0.24	Saturated persistent emergent Palustrine	Yes	No	No
<b>PEM1Bf</b>	4.60	Farmed saturated persistent emergent Palustrine	Yes	No	No
<b>PEM1Bx</b>	0.04	Excavated saturated persistent emergent Palustrine	Yes	No	No
<b>PEM1C</b>	0.08	Seasonal persistent emergent Palustrine	Yes	No	No
<b>PEM1E</b>	0.04	Seasonal saturated persistent emergent Palustrine	Yes	No	No
<b>PEM1Ef</b>	0.43	Farmed seasonal saturated persistent emergent Palustrine	Yes	No	No
<b>PEM1Fb</b>	6.66*	Beaver semipermanent persistent emergent Palustrine	Yes	No	No
<b>PFO1A</b>	4.07	Temporary broad-leaved deciduous forested Palustrine	Yes	No	No
<b>PFO1B</b>	0.55	Saturated broad-leaved deciduous forested Palustrine	Yes	No	No
<b>PFO1C</b>	1.97	Seasonal broad-leaved deciduous forested Palustrine	Yes	No	No
<b>PFO1F</b>	0.03	Semipermanent broad-leaved deciduous forested Palustrine	Yes	No	No
<b>PFO1Fb</b>	14.94*	Beaver semipermanent broad-leaved deciduous forested Palustrine	Yes	No	No
<b>PFO1J</b>	75.51*	Intermittently broad-leaved deciduous forested Palustrine	Yes	No	No
<b>POWb</b>	2.71*	Beaver unknown bottom open water Palustrine	No	Yes	No
<b>PSS1Bf</b>	0.12	Farmed saturated broad-leaved deciduous scrub-shrub Palustrine	Yes	No	No
<b>PSS1Fb</b>	2.39*	Beaver semipermanent broad-leaved deciduous scrub-shrub Palustrine	Yes	No	No

\*Wetland extends beyond the National Park Service property boundaries, hence total area will be less.

**Table 2; Riverine Systems**

<b>USFWS Symbol</b>	<b>Area (acres)</b>	<b>USFWS Wetland Classification</b>	<b>Jurisdictional Wetland</b>	<b>Other USFWS unvegetated or nonsoil wetland</b>	<b>Other Waters of the United States</b>
<b>R3RB1</b>	1.05	Bedrock rock bottom upper perennial Riverine	No	Yes	Yes
<b>R3RB2</b>	0.52	Rubble rock bottom upper perennial Riverine	No	Yes	Yes
<b>R3UB1</b>	10.64*	Cobble-gravel unconsolidated bottom upper perennial Riverine	No	Yes	Yes
<b>R3UB2</b>	2.14	Sand unconsolidated bottom upper perennial Riverine	No	Yes	Yes
<b>R3UB3</b>	0.08	Mud unconsolidated bottom upper perennial Riverine	No	Yes	Yes
<b>R3UB3b</b>	0.44*	Beaver mud unconsolidated bottom upper perennial Riverine	No	Yes	Yes
<b>R3UB3f</b>	0.97	Farmed mud unconsolidated bottom upper perennial Riverine	No	Yes	Yes
<b>R3UB3x</b>	0.67	Excavated mud unconsolidated bottom upper perennial Riverine	No	Yes	Yes
<b>R3AB3f</b>	0.18	Farmed rooted vascular aquatic bed upper perennial Riverine	Yes	No	Yes
<b>R4SB3</b>	0.11	Cobble-gravel streambed intermittent Riverine	No	Yes	Yes
<b>R4SB4</b>	0.15	Sand streambed intermittent Riverine	No	Yes	Yes
<b>R4SB5</b>	0.02	Mud streambed intermittent Riverine	No	Yes	Yes

\*Rivers and streams flowing beyond the National Park Service property boundaries, hence total area within park will be less.

### **SECTION 3**

#### **EVALUATION FOR PLANNED WETLANDS (EPW) FUNCTIONAL ASSESSMENT**

##### **Introduction:**

After the wetland identification and classification phase, the ability of the representative wetlands to perform wildlife wetland functions were evaluated. Wetland functional assessments were performed on three different types of Palustrine wetlands (beaver created system, forested depressional system and grazed emergent wetland). A fourth assessment was executed on a braided Riverine system. The purpose of this assessment was to collect information on the existing conditions and functions of the representative areas in



the project.

### **Background:**

Evaluation for Planned Wetlands (EPW) is a rapid assessment procedure used for comparing the functions of existing impacted wetlands to constructed wetlands for compensatory purposes. The open format of the functional procedure allows both the designers and decision makers to readily identify the composition of site specific traits that are important for each wetland function. EPW is typically used to evaluate a wetland impact area known as the wetland assessment area (WAA) then judges if the proposed design of the planned wetland (PW) provides similar or improved functional benefits. The EPW method can assess the functions for shoreline bank erosion control, sediment stabilization, water quality, wildlife, fisheries, and uniqueness / heritage. Since the project is a National Historical Park, it is deemed to be unique with a rich heritage. The rural setting also lends itself to be effective for the remaining functions except for fisheries and wildlife. Since EPW was developed specifically for wetlands, it was deemed that only the wildlife function would be used for this project. The wildlife function is defined as follows:

- Wildlife [WL]: degree to which a wetland functions as a habitat for wildlife, termed the habitat complexity of the wetland. Horizontal and vertical vegetation stratifications have been demonstrated to provide for wildlife richness and diversity as layering and more complex cover type interspersions increase.

### **Scoring:**

Referring to the flow model diagrams in the appendix, the wildlife function contains fifteen elements. Each element is a physical, chemical, or biological characteristic of the wetland being assessed. The element score is a unitless number from 0.0 to 1.0, with 1.0 representing an optimal condition for maximizing functional capacity, and 0.0 representing the most minimal condition. The elements are combined into assessment models, as shown in **Appendix B**, to determine the Functional Capacity Index (FCI) of each function assessed in a wetland. The FCIs are also dimensionless and unitless numbers (0.0 to 1.0) which describe a wetland's relative capacity to perform a function independent of size. In other words, an FCI represents the "quality" of functional capacity per unit area. Functional Capacity Units (FCUs) are determined by multiplying the FCIs by the area providing the function. This computation allows the comparison of the gains or losses based on area created compared to the area impacted.



**Table 3; Wetland Functional Capacity Index Results**

<b>Wetland Assessment Area</b>	<b>Wildlife FCI Score</b>	<b>Discussion</b>
North Beaver Complex	0.69	This wetland complex has diverse interspersions of open water, emergent, scrub-shrub and forested wetlands. Vertical structure is diverse both horizontally and vertically. These features provide a rich structure for wildlife habitat.
Braided Stream Complex	0.48	Though not as complex as the north beaver complex, the varied streams along Plain Run Branch provide vegetation to water interspersions. Vertical structure also is above average with a fairly complex spatial pattern of shrubs and trees.
Grazed Emergent Wetland System	0.18	This system has been extensively used by cattle resulting in no vertical structure with a significant disturbance of wildlife habitat. Very little vegetation to water interspersions exists with channels exhibiting erosion.
Depressional Wetland System	0.46	This system has average vertical layers that are in fair condition. Seasonally, open water exists until summer allowing some vegetation to water interspersions.

### **RIVERINE ASSESSMENT**

Streams within the project area generally arise as discharge head seep systems in shallow valleys in the southern, central and northern project areas. In the northwestern section of the project and the central stream reach north of Appomattox Court House, downcutting was observed apparently in response to historical land uses. These systems exhibited nick points in upgradient landscape positions with the higher elevation channels flowing intermittently. Downgradient of the nick points, groundwater intersection appears to provide perennial flow in the stream channels.

Referring to Appendix D; Riverine Assessment Forms, thirteen (13) assessments were executed on representative stream reaches throughout APCO property. The locations of the assessments are provided on Plates 5 through 9. This method employs ranking on a scale from 0 to 20, ten (10) different habitat parameters ranging from substrate to channel geometry relationships. At three locations (RA-7, RA-8 & RA-13), the floodplain connectiveness was also evaluated. This assessment is ranked on a scale from 0 to 10 on seven (7) different habitat parameters.

The scoring criteria are based upon the concept of a reference condition. This condition is considered to be the least impaired, best attainable condition for a stream in the project. For the first order streams that serve as tributaries to the Appomattox River and Plain Run Branch, this represents a score of 165 for RA-11. The higher order streams that included floodplain wetlands reference score is 178 for RA-7 for the channel and 68 for RA-8 for floodplain. A relational score to this number of at least 90% or greater is considered to represent excellent stream conditions. Good conditions are judged to lie between 75% and 90% with the fair

to poor conditions threshold at 65%.

The raw and reference scores with the associated stream ratings are provided in the following table:

**Table 4; Riverine Assessment Score and Ratings**

Assessment Number	USFWS Classification	Location	Raw Score	Reference Score & Stream Rating	Comments
RA-1	R3UB3f	Map Panel 5 (Plate 9)	60	36% & Poor	Active cattle grazing along stream reach
RA-2	R3UB3f	Map Panel 1 (Plate 5)	59	36% & Poor	Active cattle grazing along stream reach
RA-3	R3UB1	Map Panel 1 (Plate 5)	147	89% & Good	Forested section of stream not grazed
RA-4	R3UB1	Map Panel 3 (Plate 7)	133	81% & Good	Downgradient section of stream north of Appomattox Court House
RA-5	R3RB1	Map Panel 3 (Plate 7)	69	41% & Poor	Midgradient section of stream north of Appomattox Court House
RA-6	R3UB2	Map Panel 3 (Plate 7)	139	84% & Good	Upgradient section of stream north of Appomattox Court House
RA-7*	R3UB1	Map Panel 1 (Plate 5)	178 54**	100% & Excellent 79% & Good**	Downgradient section of Appomattox River
RA-8*	R3UB1	Map Panel 3 (Plate 7)	155 68**	87% & Good 100% & Excellent**	Midgradient section of Appomattox River
RA-9	R3UB2	Map Panel 3 (Plate 7)	78	47% & Poor	Tributary stream to Appomattox River
RA-10*	R3UB3b	Map Panel 2 (Plate 6)	143	80% & Good	Stream section within influence of beaver dam
RA-11	R3UB1	Map Panel 2 (Plate 6)	165	100% & Excellent	Also represents western stream section
RA-12	R3UB3f	Map Panel 1 (Plate 5)	79	48% & Poor	Also represents upper stem of eastern stream
RA-13*	R3UB1	Map Panel 3 (Plate 7)	116 55**	65% & Fair 81% & Good	Typical of downgradient Plain Run Branch with floodplain

\*Higher order stream sections with associated floodplains with RA-7 used as channel reference score and RA-8 used as floodplain reference score

\*\*Floodplain assessment score

In general, forested ungrazed streams in the western site sections are deemed to be of good quality while streams within the active grazing zones have been significantly impacted due to cattle resulting in poor or unsupporting ratings. One first order reach, represented by RA-11 was noted to be of exceptional habitat quality with the higher order reaches of Appomattox River judged to be consistently good. With the exception of a fair rating for Plain Run Branch mostly attribute to a narrow riparian width, no fair ratings were obtained during the riverine assessment portion of the study. It is therefore judged that active cattle grazing significantly degrades the riverine APCO aquatic resources.

### **CONCLUSIONS**

From the results of our field work, it is our opinion that the Palustrine systems represented by possess all three criteria (hydrophytic vegetation, wetland hydrology and hydric soils) necessary to designate these

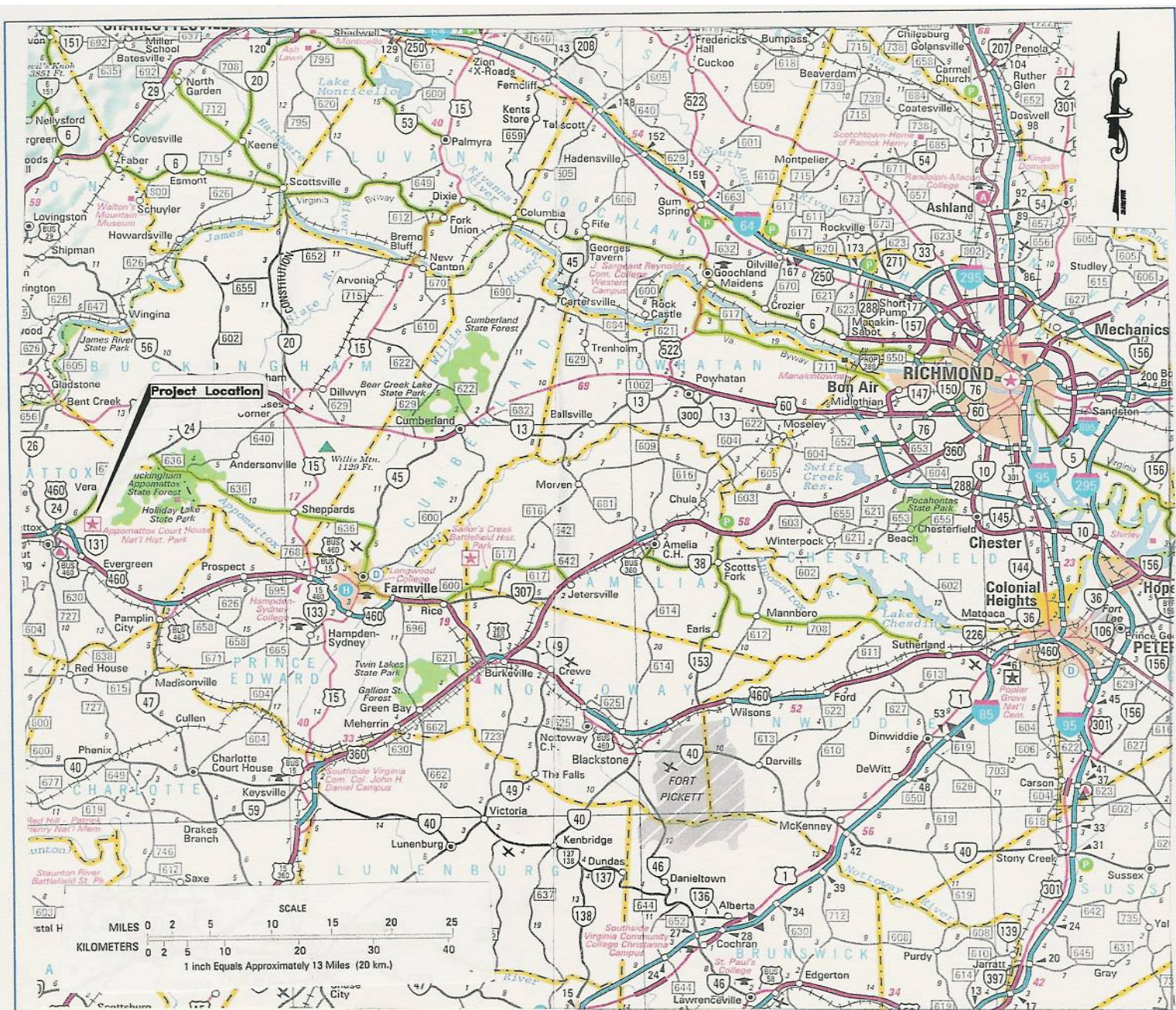
areas as wetland areas by the 1987 COE criteria and also satisfy the USFWS criteria for wetland status. Though not technically wetlands by COE criteria, the Riverine systems do satisfy Cowardin et al classification criteria hence also are regulated under National Park Service guidelines. Therefore, we judge all of these ecosystems subject to Section 404 (Clean Water Act of 1977) jurisdiction and also to NPS Director's Order #77-1.

Under section 404 of the Clean Water Act, the Army Corps of Engineers may issue permits authorizing dredge and fill activities in wetlands and other "waters of the United States". Jurisdictional delineations are used to determine wetland areas requiring such permits. In the Norfolk District, the Corps of Engineers requires all delineations to be performed in accordance with the "Corps of Engineers Wetlands Delineation Manual, 1987" (Technical Report #Y-87-1).

**General Conditions:**

This report has been prepared in accordance with generally accepted wetland investigation and functional assessment practices to aid in the evaluation and design of the project. The vegetation zone delineations are based upon our identification of plant species present at the time of our field examination. Seasonal variations in type and composition of plant species, in particular non-persistent herbaceous plants, are to be expected. Hydrology observations portray conditions present at the time of the field study and directly depend upon the time of year and amount of prior precipitation when obtained. Prior to any final design, the flagged boundaries should be reviewed and approved by the appropriate regulatory agencies, then, if required, field located by survey party. The final project design and/or contractual obligations should use only regulatory agency approved wetland delineations.





#### Notes:

- 1) Plate obtained from State of Virginia Highway Map.
- 2) Site location depicted by Environmental Concern Inc. and is approximate.



**Environmental Concern**

P. O. Box P, St. Michaels, MD 21663 (410) 924-4316

**Appomattox Court House  
National Historical Park  
Appomattox County, Virginia**

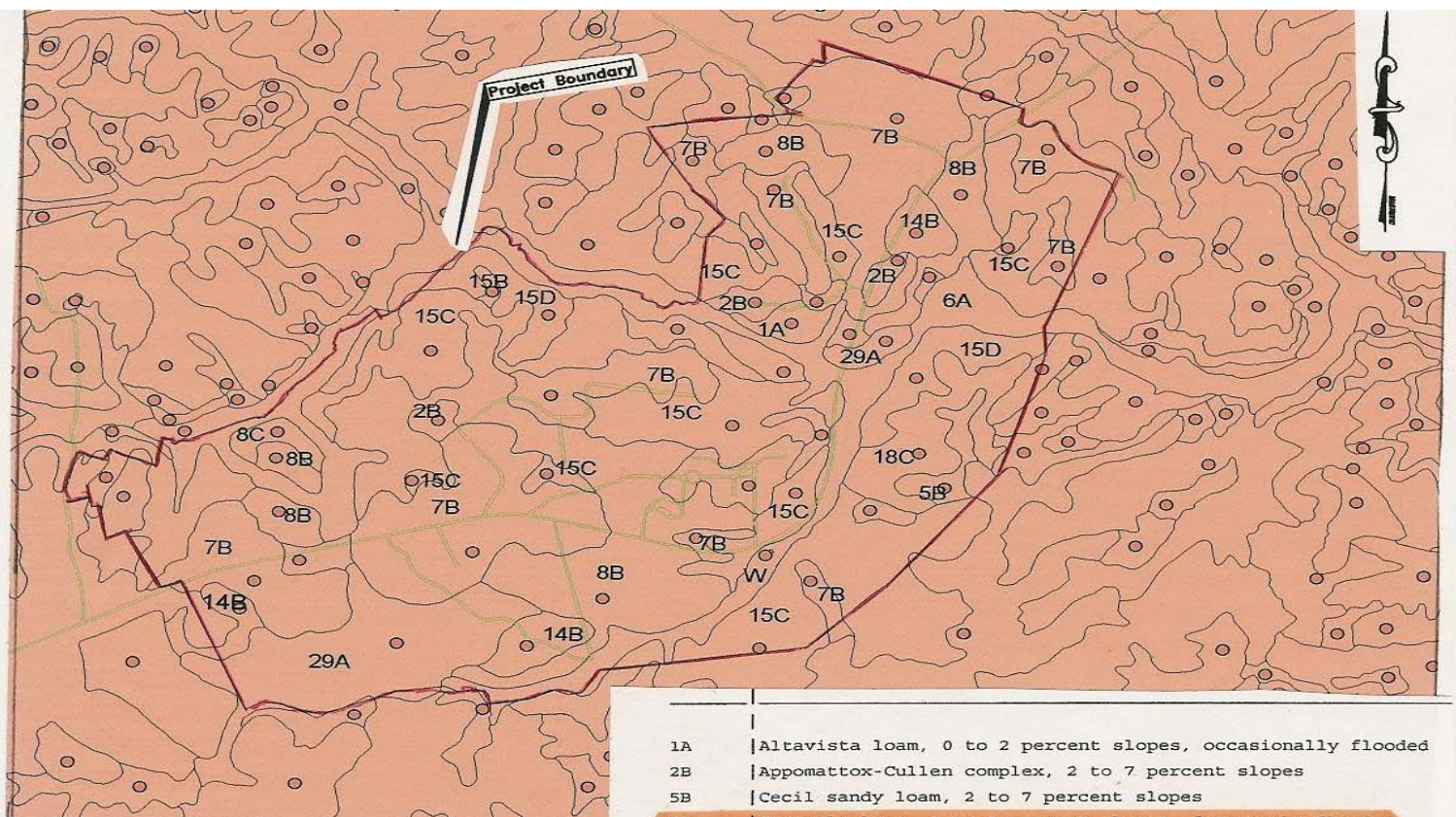
#### Site Location Map

scale	As Shown	drawn by	FAM	Plate
date	5/28/02	checked by	FAM	1
project no.	02003			









HYDRIC SOIL UNIT

1A	Altavista loam, 0 to 2 percent slopes, occasionally flooded
2B	Appomattox-Cullen complex, 2 to 7 percent slopes
5B	Cecil sandy loam, 2 to 7 percent slopes
6A	Chewacla loam, 0 to 2 percent slopes, frequently flooded
7B	Cullen clay loam, 2 to 7 percent slopes
8B	Iredell loam, 2 to 7 percent slopes
8C	Iredell loam, 7 to 15 percent slopes
12B	Mattaponi-Cecil complex, 2 to 7 percent slopes
14B	Mecklenburg loam, 2 to 7 percent slopes
15B	Mecklenburg-Poindexter complex, 2 to 7 percent slopes
15C	Mecklenburg-Poindexter complex, 7 to 15 percent slopes
15D	Mecklenburg-Poindexter complex, 15 to 25 percent slopes
18C	Pacolet-Louisburg complex, 7 to 15 percent slopes
19E	Poindexter gravelly silt loam, 25 to 60 percent slopes
26	Udorthents-Urban Land complex, 0 to 15 percent slopes
29A	Wehadkee loam, 0 to 2 percent slopes, frequently flooded

#### Notes:

1) Plate obtained from Arcview theme provided by National Park Service.

2) Site boundaries and road locations also provided as an Arcview themes by National Park Service

3) Map key interpretation provided by the Soil Conservation Service.



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Appomattox Court House  
National Historical Park  
Appomattox County, Virginia

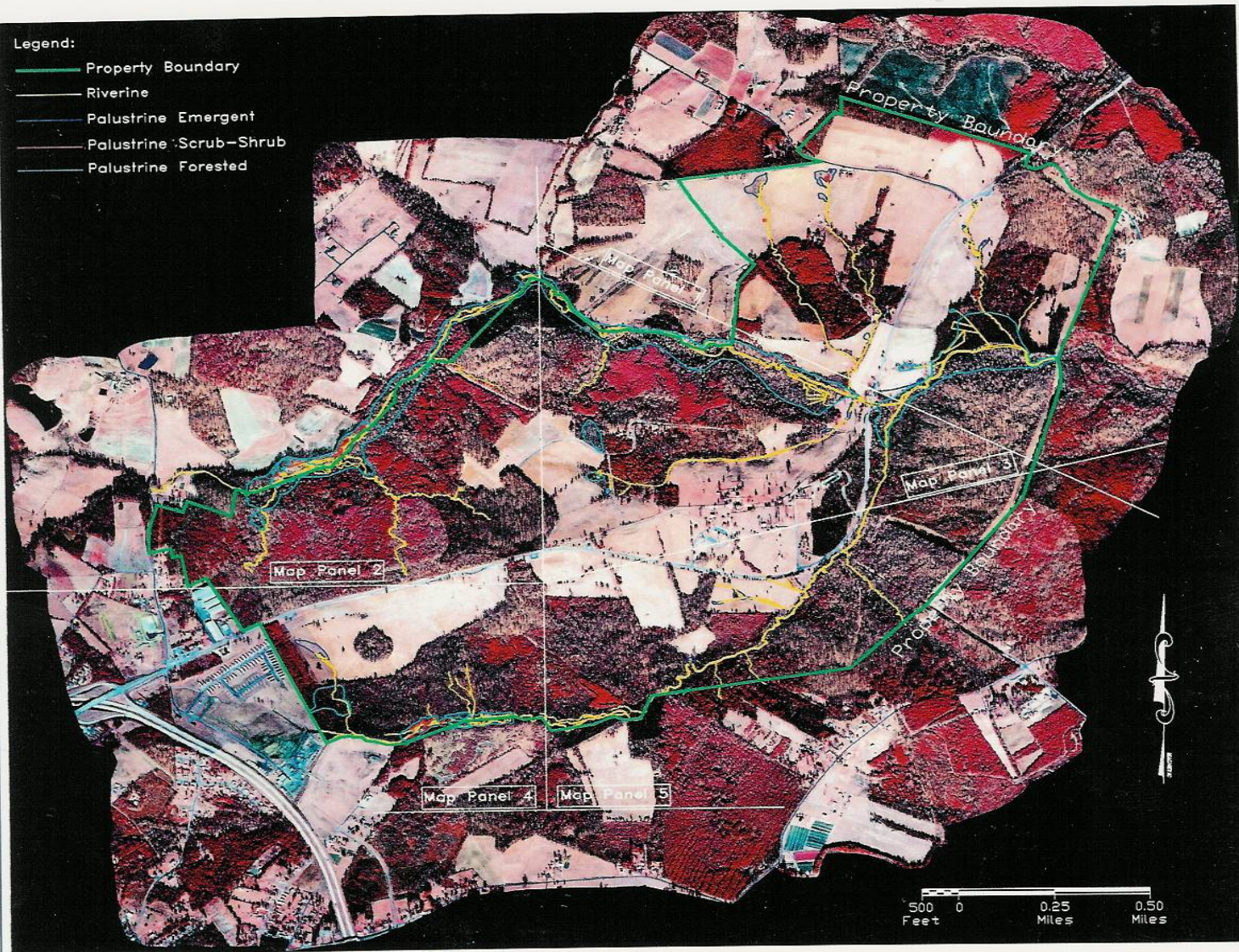
#### Soil Series Map

scale	As Shown	drawn by	FAM	Plate
date	5/28/02	checked by	FAM	3
project no.	02003			



Legend:

- Property Boundary
- Riverine
- Palustrine Emergent
- Palustrine Scrub-Shrub
- Palustrine Forested



**NOTES:**

1) Field delineation and assessment work performed during April 13th through 17th, 2002 by Environmental Concern Inc.

2) Boundaries located using GPS reference points and color infrared aerial photography interpretation.

3) Plates 5 through 9 represent wetlands mapped at each representative map panel indicated above.



**Environmental Concern**

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**Appomattox Court House  
National Historical Park  
Appomattox County, Virginia**

**Wetland & Waters of the US Boundaries  
Map Panel Key**

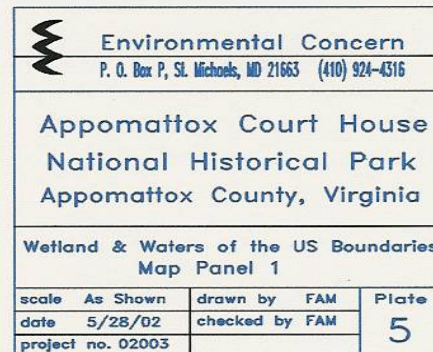
scale	As Shown	drawn by	FAM	Plate <b>4</b>
date	5/28/02	checked by	FAM	
project no.	02003			



**United States Fish and Wildlife Service Wetland Classification Designations**  
***Appomattox Court House National Historical Park***  
***Appomattox County, Virginia***

<b>USFWS Symbol</b>	<b>USFWS Wetland Classification</b>	<b>USFWS Symbol</b>	<b>USFWS Wetland Classification</b>
<b>PEM1B</b>	Saturated persistent emergent Palustrine	<b>PSS1Bf</b>	Farmed saturated broad-leaved deciduous scrub-shrub Palustrine
<b>PEM1Bf</b>	Farmed saturated persistent emergent Palustrine	<b>PSS1Fb</b>	Beaver semipermanent broad-leaved deciduous scrub-shrub Palustrine
<b>PEM1Bx</b>	Excavated saturated persistent emergent Palustrine	<b>R3RB1</b>	Bedrock rock bottom upper perennial Riverine
<b>PEM1C</b>	Seasonal persistent emergent Palustrine	<b>R3RB2</b>	Rubble rock bottom upper perennial Riverine
<b>PEM1E</b>	Seasonal saturated persistent emergent Palustrine	<b>R3UB1</b>	Cobble-gravel unconsolidated bottom upper perennial Riverine
<b>PEM1Ef</b>	Farmed seasonal saturated persistent emergent Palustrine	<b>R3UB2</b>	Sand unconsolidated bottom upper perennial Riverine
<b>PEM1Fb</b>	Beaver semipermanent persistent emergent Palustrine	<b>R3UB3</b>	Mud unconsolidated bottom upper perennial Riverine
<b>PFO1A</b>	Temporary broad-leaved deciduous forested Palustrine	<b>R3UB3b</b>	Beaver mud unconsolidated bottom upper perennial Riverine
<b>PFO1B</b>	Saturated broad-leaved deciduous forested Palustrine	<b>R3UB3f</b>	Farmed mud unconsolidated bottom upper perennial Riverine
<b>PFO1C</b>	Seasonal broad-leaved deciduous forested Palustrine	<b>R3UB3x</b>	Excavated mud unconsolidated bottom upper perennial Riverine
<b>PFO1F</b>	Semipermanent broad-leaved deciduous forested Palustrine	<b>R3AB3f</b>	Farmed rooted vascular aquatic bed upper perennial Riverine
<b>PFO1Fb</b>	Beaver semipermanent broad-leaved deciduous forested Palustrine	<b>R4SB3</b>	Cobble-gravel streambed intermittent Riverine
<b>PFO1J</b>	Intermittently broad-leaved deciduous forested Palustrine	<b>R4SB4</b>	Sand streambed intermittent Riverine
<b>POWb</b>	Beaver unknown bottom open water Palustrine	<b>R4SB5</b>	Mud streambed intermittent Riverine







500 Ft. 0 0.25 Miles 0.50 Miles

Map Panel 2

Map Panel 3

Map Panel 4

Map Panel 5

WFA-North  
Beaver  
Complex

Wildlife  
Functional  
Assessment

WDS-PF01B

Wetland  
Data  
Sheet

RA-11

Riverine  
Assessment

NPS Property Boundary

WFA-North  
Beaver  
Complex

PSS1Fb

PQWb

PF01Fb

WDS-PF01B

WDS-PEM1/SS1Fb

RA-10

RA-11

R3UB1

PF01J

PF01Fb

R3UB3b

ER4SB3

R4SB3

R4SB4

R4SB3

R3UB1

PF01B

R3UB3c


R3UB1

R3UB1

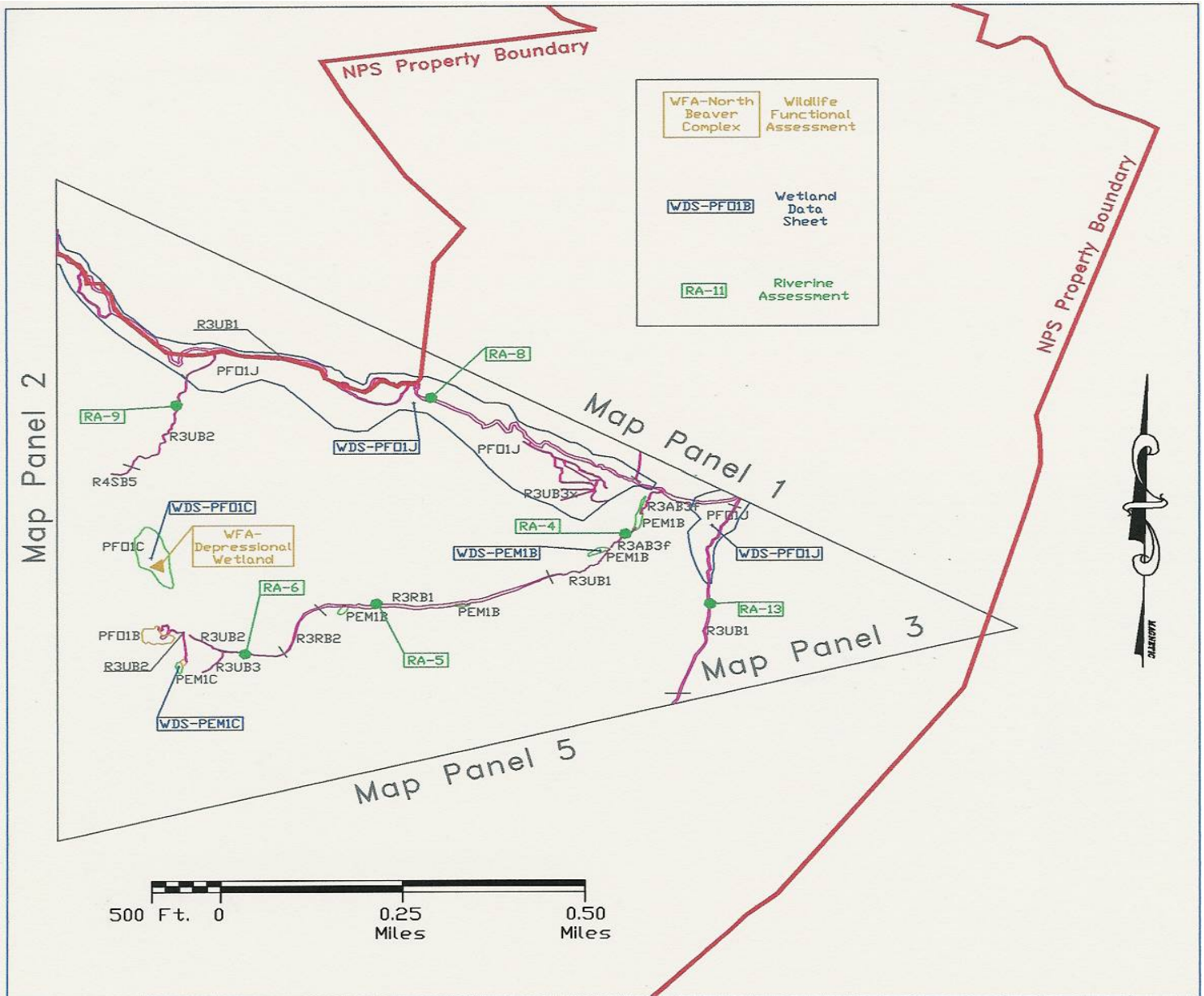
R3UB3


R3UB3

R4SB5

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<b>Appomattox Court House National Historical Park Appomattox County, Virginia</b>		
<b>Wetland &amp; Waters of the US Boundaries Map Panel 2</b>		
scale	As Shown	drawn by FAM
date	5/28/02	checked by FAM
project no.	02003	
		Plate <b>6</b>

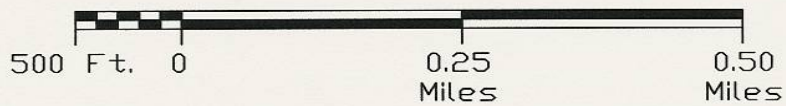




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<b>Appomattox Court House National Historical Park Appomattox County, Virginia</b>			
<b>Wetland &amp; Waters of the US Boundaries Map Panel 3</b>			
scale	As Shown	drawn by	FAM
date	5/28/02	checked by	FAM
project no.	02003		
			<b>Plate</b> <b>7</b>



WDS-PF01B Wetland Data Sheet




Map Panel 2

Map Panel 4

Map Panel 3

Map Panel 5

			
Environmental Concern			
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Appomattox Court House National Historical Park Appomattox County, Virginia			
Wetland & Waters of the US Boundaries Map Panel 4			
scale	As Shown	drawn by	FAM
date	5/28/02	checked by	FAM
project no.	02003		
			Plate 8

Map Panel 2

Map Panel 4



Map Panel 3

Map Panel 5

WFA-Grazed  
Emergent  
Wetland  
System

WFA-Braided  
Stream  
Complex

Degraded  
Section  
Due to  
Cattle

WDS-R3SB4

R3UB3f  
PEM1EF  
PEM1BF  
WDS-PEM1E

RA-1

R3UB3f

R3UB3f

R3UB1

R3UB1

R3UB1

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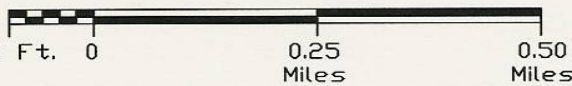
R3UB1

R3UB1

R3UB1

R3UB1

R3UB1



WFA-North Beaver Complex	Wildlife Functional Assessment
WDS-PFO1B	Wetland Data Sheet
RA-11	Riverine Assessment

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<b>Appomattox Court House National Historical Park Appomattox County, Virginia</b>		
<b>Wetland &amp; Waters of the US Boundaries Map Panel 5</b>		
scale	As Shown	drawn by FAM
date	5/28/02	checked by FAM
project no.	02003	
		<b>Plate</b> <div style="border: 1px solid black; width: 20px; height: 20px; text-align: center; line-height: 20px;">9</div>

**Appendix A;**  
**Routine Wetland Determination**  
**Data Forms**  
*(Forms included in hard copy report)*

**Appendix B;**  
**Evaluation for Planned Wetlands**  
**Functional Capacity Index**  
**Flow Model Diagrams**  
*(Forms included in hard copy report)*

**Appendix C;**  
**Evaluation for Planned Wetlands**  
**Functional Assessment**  
**Blank Set Field Data Forms**  
*(Forms included in hard copy report)*



**Appendix D;**  
**Riverine Assessment Forms**  
*(Forms included in hard copy report)*